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EXPÉDITION ANTARCTIQUE BELGE

RÉSULTATS

DU

VOYAGE DU S. Y. BELGICA

EN 1897-1898-1899

SOUS LE COMMANDEMENT DE

A. DE GERLACHE DE GOMERY

RAPPORTS SCIENTIFIQUES

PUBLIÉS AUX FRAIS DU GOUVERNEMENT BELGE, SOUS LA DIRECTION

DE LA

COMMISSION DE LA BELGICA

ZOOLOGIE

CIRRIPEDIA

BY

P. P. C. HOEK

ANVERS

IMPRIMERIE J.-E. BUSCHMANN

REMPART DE LA PORTE DU RHIN

1907

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CIRRIPEDIA

BY

P. P. C. HOEK

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Sorti des presses de J.-E. BUSCHMANN, Anvers
le 3 Juin 1907.

CIRRIPEDIA

BY

P. P. C. HOEK

INTRODUCTION

The collection of Cirripedia made during the cruise of the S. Y. BELGICA contains three species : one species of the genus *Balanus,* one of *Elminius* and one of *Verruca.* The *Balanus*- and *Elminius*-species were collected, during shore exploration, in the Magellan countries ; the *Verruca*-species was taken with tangles (fauberts) at a depth of over 500 meters at about 70° lat. S. Whereas the first two are well known forms belonging to the South-American coastal fauna, the third is a true antarctic deep-sea species which has never been described before.

The coastal waters of subantarctic South-America do not seem to be very rich in species of Cirripedia. When describing the Cirripedia of the Hamburg Magellanic Collecting Voyage (1), WELTNER (in 1898) enumerated 17 species (2) as belonging to the subantarctic Fauna of South-America, but of these 9 only belong to the coastal fauna of that region, viz. 1 species of *Elminius* (*E. Kingi,* J. E. Gray), 5 species of *Balanus* (*B. flosculus* Darwin, var. *sordidus* Darwin, *B. improvisus* Darwin, *B. laevis* Bruguière, *B. psittacus* (Molina) and *B. tintinnabulum* (L.), var. *communis* Darwin), 2 of *Chthamalus* (*C. cirratus* Darwin and *C. scabrosus* Darwin) and 1 *Verruca* (*V. laevigata* G. B. Sowerby) ; the other species are deep-sea species or have as true pelagic animals a world-wide distribution.

Nor is the number of known *antarctic* species of Cirripedia large, the only species so far as I know being the *Scalpellum* collected near the South Polar Circle, during the cruise of the English man of war CHALLENGER, for which I proposed the name *Scalpellum antarcticum* (3).

(1) Hamburger Magalhaenische Sammelreise. Cirripedien, bearbeitet von Dr. W. WELTNER. Hamburg, L. Friedrichsen & C°, 1898.

(2) Moreover one parasitical form (*Peltogaster*) and one of DARWIN's Abdominalia (*Cryptophialus*).

(3) Report on the scientific results of the voyage of H. M. S. CHALLENGER. Zoology, Vol. VIII, Part. XXV. Report on the Cirripedia, 1883.

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DESCRIPTION OF THE SPECIES

1. — **Balanus laevis** Bruguière

There are two sets of very small specimens of a *Balanus*, which being quite young I think it would be very difficult to determine with certainty but for the very characteristic shape of their scutum. The deep longitudinal furrow of that valve is very distinctly developed and extends down towards the actual basal margin. They have conical shells with the surface naked and white, with a small orifice and very narrow radii. There is only one slightly larger specimen, the greatest diameter of its basis measuring 3 mm., and in this specimen the whiteness of the surface is not so apparent ; all the other specimens — all together about a dozen — are much smaller, their basis measuring from not quite 1 to about 1.5 mm. and these have all perfectly naked and white shells.

This species has been collected at different places along the coast of South-America : Peru, Chili, Tierra del Fuego. According to Darwin it occurs moreover in California and Weltner (1) makes mention of specimens from Brasil. Darwin distinguished, besides the typical form, two varieties ; but the little animals collected by the Belgica seem to belong to the typical form as described by Darwin.

Both lots were collected Lapataïa, Beagle Canal, Tierra del Fuego, Argentine, December 24th, 1897. The one was found on the rocks amidst calcareous Algae and Serpulidae, at the level of high water. The other lot was taken from the carapace of *Halicarcinus planatus*.

2. — **Elminius Kingi** J. E. Gray

This species was met with on two different occasions : once at Hope Harbour (Clarence Island) and once at Lapataïa (Beagle Canal). It is a very characteristic form and is represented by numerous specimens from both localities.

Darwin knew this species from Tierra del Fuego, the Falklands Islands and Chiloë ; Weltner (l. c.) names also Puerto Mont (Chili) as one of the localities from which the Berlin Museum has specimens ; Gruvel (2) adds Puntas-Arenas and Orange Bay to the list. They are all places situated in sub-antarctic South-America and the distribution of this species seems to be limited, therefore, to the southern part of this continent.

With regard to its occurrence at the two stations where it was collected during the cruise of the S. Y. Belgica, the following annotations were made :

Hope Harbour, Clarence Island, Magdalen Sound, Magallanes, Chili. December 14th, 1897. Covers the rocks completely, here and there, at highwater level.

Lapataïa, Beagle Canal, Tierra del Fuego, Argentine. December 24th, 1897. Very common on the rocks, the Patellas, and especially the Mytili which form continuous layers round the Bay, at half-tides level. Also very common on the rocks, at highwater level.

(1) Weltner, W., Verzeichnis der beschriebenen Cirripedienarten. Archiv f. Naturgeschichte, 1897, I, S. 263.
(2) Gruvel, A., Monographie des Cirrhipèdes. Paris, 1905, p. 294.

3. — **Verruca mitra** n. sp.

(With four figures)

Shell white, surface smooth, with prominent lines of growth and very distinct articulating ridges. Wall formed by the fixed scutum and tergum nearly perpendicular to the surface of attachment ; that formed by the rostrum, the carina and movable valves inclined and meeting the fixed valves at a sharp edge ; base rather broad, oval. Movable scutum with two articular ridges, apex pointed not projecting freely ; movable tergum also with two ridges and the apex rounded. Rostrum and carina large, broad, so as to form part of the wall at the side of the fixed scutum and tergum. Apex of the rostrum and carina projecting freely beyond the surface of the shell, that of the carina distinctly recurved.

This beautiful deep-sea species is represented by two specimens, the one about three times as large as the other. Though the smallest in nearly every regard resembles the larger, for the description the latter is used especially.

The surface of the shell is naked, there being no trace of a chitinous membrane. The shell is beautifully white and looks as if it was cut out of ivory ; lines of growth on all the valves very distinct and the so-called articular ridges prominent.

Seen from above the total shape of the shell is that of an oblique pyramid, inclining with its tip towards the side of the fixed scutum and tergum and also towards that of the carina. As the base of the shell is irregularly oval, the lower part of the pyramid is more like a flattened conus ; but the upper part, when seen from above, shows three nearly flat sides : one formed by the movable scutum and tergum, one by the rostral half of the fixed scutum and one by the other half of that valve combined with the fixed tergum. Seen from the side of the movable valves the shell is almost symmetrical and has a certain likeness to a cap or bonnet, the carina and rostrum forming the wider under part, the movable scutum and tergum the conical central part and the tip of the cap.

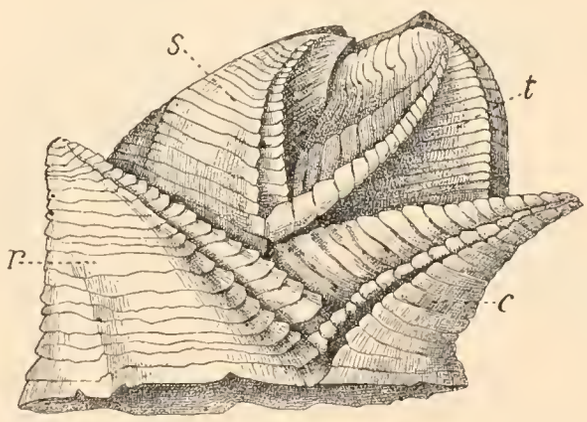

Fig. 1

Verruca mitra, n. sp., seen from the side of the movable scutum and tergum. Magnified 10 diameters. *s* = movable scutum ; *t* = movable tergum ; *r* = rostrum ; *c* = carina.

The *movable scutum* is rather large, though not inconsiderably smaller than the movable tergum. It has the ordinary triangular shape. Its occludent margin is curved and forms with the tergal margin a pointed, slightly beaked apex. The basal margin is straight ; its length equals two thirds of the length of the tergal margin. The latter describes an irregular line : in its under part it has two excavations, in which fit the extremities of the articular ridges of the tergum, and between these two excavations the one ridge of the scutum forms itself a tooth-like projection ; the upper part of the tergal margin shows a little protuberance which fits into a shallow excavation of the scutal margin of the tergum. The scutum has two well developed articular ridges which run from the basi-tergal corner nearly to the apex of the valve. The growth ridges run parallel to the basal margin in the main part of the valve and nearly parallel to the tergal margin in the smaller part which is situated between one of the articular ridges and the tergal margin.

The *movable tergum* is broad and its shape is irregularly quadrangular. Two of its sides form together the occludent margin and meet in a rounded angle ; the third side is the nearly straight basal margin, the length of which equals that of the scutal margin. The latter fits with its teeth and excavations into the corresponding excavations and teeth of the tergal margin of the scutum. The surface of the valve is furnished with two distinct ridges : the axial ridge is the most prominent, it widens downwards and projects distinctly at the scutal-basal point of the valve. The other articular ridge runs close to the axial ridge ; it is less prominent but it widens also downwards. The part of the valve situated between the latter ridge and the occludent margin is slightly hollowed out but there is no trace of a third ridge in this part of the valve.

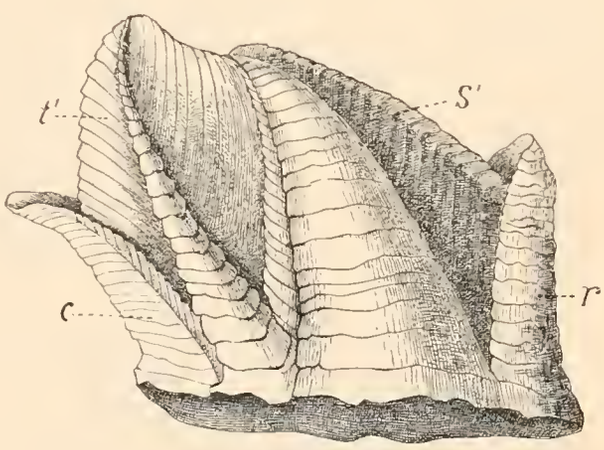

Fig. 2

Same animal, seen from the side of the fixed scutum and tergum. Magnified 10 diameters.
s' = fixed scutum ; t' = fixed tergum ; r = rostrum ; c = carina.

The *fixed scutum* is shorter, but considerably broader towards the base than the tergum. It consists of two triangular portions meeting along a curved line and describing together an obtuse angle. Both portions show very distinct lines of growth and are beaked at the apex. The occludent margin is curved and furnished with a slightly upturned marginal rim ; the terginal margin is hollowed out and furnished with a kind of radius projecting over the edge

of the fixed tergum. This radius has a triangular shape, broad at its base and sloping towards the upper extremity.

The *fixed tergum* is irregularly rhombiform, or, more precisely as the basal margin though narrow may not be overlooked, elongated pentagonal. Its apex is bluntly beaked. It consists of three portions — a middle and two lateral. The middle portion is narrow, pointed at the apex and increases in width towards the base ; it forms a kind of rim projecting over the surface of the two lateral portions, which do not lie exactly in the same plane but describe together a very obtuse angle. These lateral portions are of nearly equal size and both of a triangular form. One is placed between the rim and the scutal margin with the occludent margin short and slightly hollowed out ; the lines of growth of this portion run parallel to the scutal margin. The other portion fits in between the rim and the carina ; its occludent margin is longer and slightly curved and its lines of growth run parallel to its basal margin and the free edge of the carina.

The *rostrum* and the *carina* though exhibiting by far their largest portions at the side of the movables valves (Fig. 1) form also part of the wall at the other side of the shell. Both valves project freely — the carina more so than the rostrum — beyond the edge formed by the scutum and the tergum. The projecting portion of the carina is distinctly recurved, whereas that of the rostrum is nearly straight. The lines of growth of both valves are very distinct, they are irregularly parallel to one another and to the basal margins of the valves.

Both valves are furnished with a double articular ridge, separated from one another by a distinct longitudinal furrow. They have in both valves about the same direction, running from the base of the valve near the place where the rostrum meets the carina and vice versa towards the apex. In the rostrum the upper of this double ridge forms the margin of the valve along the base of the movable scutum ; in this valve the under extremities of both ridges project like teeth fitting into excavations of the rostral margin of the carina. In the carina the double ridge is separated from the slightly curved upper (or tergal) margin by a triangular portion, which is rather broad where it meets the rostrum and terminates in a point at the apex of the valve. The upper ridge of the rostrum terminates also in a tooth-like projection which fits into the excavation between the two teeth of the carinal margin of the rostrum.

Fig. 3

Same animal seen from the side of the fixed scutum and tergum and partly from underneath. Magnified 4.4 diameters.

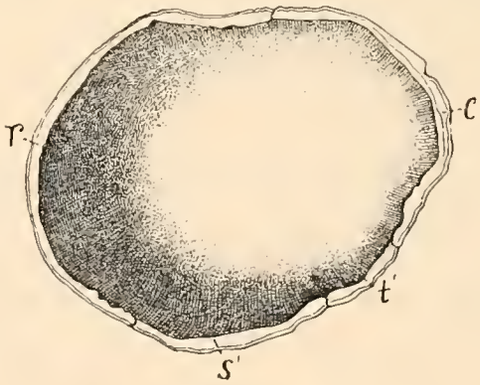

Fig. 4

The circumference of the shell, seen from underneath. Magnified 10 diameters. *s'*, *t'*, *c* and *r* as in figure 2.

Basis. Both specimens were received loosened from the surface of attachment so that their basis could not be investigated. Its shape is broad oval : the interspace between the parietes grows wider in the under part of the shell and these parietes extend moreover slightly above the basal margin.

Size. The greatest diameter of the shell at the base is, in the largest specimen, not quite 6 mm., the height of the shell is nearly 5 mm.

The structure of the animal's body has not been studied. It would have been necessary to sacrifice the larger specimen for that purpose and this was not thought desirable. In many regards this structure would have been found, most probably, similar to that of *Verruca gibbosa* Hoek, of which a rather extensive description is given at p. 137-138 of the Report on the Cirripedia collected during the cruise of the CHALLENGER, 1883.

This species was taken in the Antarctic Region, October 18th, 1898. It was caught with the Faubert Nr VIII, at about lat. 70° S. and long. 80° 48′ W. The depth at that place will have been about 555 m. to judge from the depth of the two nearest places for which the depth is given.

Observation regarding the relation of the present species to the other species of the genus *Verruca*. The deep-sea species of *Verruca* bear a great resemblance to one another and as diagnosis and description have often been given based on a single specimen, or at most very scanty material, some at least of the species described may in future turn out to be synonyms only (1). On the other hand it might easily lead to confusion in our knowlegde of the geographical distribution of the different species, when a form from a special locality was identified with a species from another locality, so long as doubt as to their identity is allowed. In the present case I thought, therefore, there was sufficient reason to describe as a new species the animal collected by the BELGICA. Its most characteristic features are, I think, the general shape of the animal as a whole, the absence of the so-called « first » articular ridge from the scutum and the great dimensions of the rostrum and the carina which, in consequence, form part of the wall of the animal at the side of the fixed scutum and tergum also. Only investigation of a much richer material can prove whether these features really hold good to distinguish this form from the by all means nearly related species : *Verruca gibbosa* and *Verruca quadrangularis*, both species described by the present author from animals collected by the CHALLENGER in the Southern Atlantic.

With regard to the geographical distribution of the known species of *Verruca* the following may find a place here : in all 25 species (2) of this genus have been described, viz. 18 in the North Atlantic, 3 in the South-Atlantic, 1 (coastal form) Tierra del Fuego etc., 1 (the present species) South Polar region, 1 Pacific (near Kermadec Islands) and 1 South of the Philippines.

(1) AURIVILLIUS and GRUVEL describe 10 different species of *Verruca* as occurring near the Azores, for example ; between some of these the differences seem to be very small...

(1) Since this was written, I received a paper of GRUVEL (Cirrhipèdes operculés de l'Indian Museum de Calcutta) published in the Memoirs of the Asiatic Society of Bengal, Vol. II, N° I, 1907, in which 4 new species of *Verruca* are described. They were collected near the Andaman Isls. (Bay of Bengal) and near Malacca Strait.

(Note during press)

The North Atlantic species have the following distribution :

1 (*V. strömia* O. Müller) North Sea coasts, Mediterranean etc. : coastal form.

1 (*V. magna* Gruvel) Golfe de Gascogne : deep-sea species.

10 (*V. erecta* Gruvel, *cornuta* Aurivillius, *sculpta* Auriv., *crenata* Auriv., *aequalis* Auriv., *trisulcata* Gruv., *inermis* Auriv., *costata* Auriv., *recta* Auriv., *linearis* Gruv.) Azores : deep-sea species.

1 (*V. obliqua* Hoek) Off South West point of Spain : deep-sea species.

1 (*V. Spengleri* Darwin) Madeira : shallow water (?).

1 (*V. radiata* Gruvel) Canaries : 912 m.

1 (*V. longicarinata* Gruvel) Sargasso Sea : deep-sea species.

1 (*V. nexa* Darwin) West-Indies : shallow water (?).

1 (*V. striata* Gruvel) Cape de Verde Islands : 600 m.

The South Atlantic species are :

V. gibbosa Hoek, lat. 48° 37′ S., long. 55° 17′ W., 1863 m.

V. quadrangularis Hoek, lat. 35° 39′ S., long. 50° 47′ W., 3420 m.

V. incerta Hoek, lat. 32° 34′ S., long. 13° 5′ W., 2565 m.

The species observed at Tierra del Fuego and at Eastern Patagonia (at a depth of 35 m.), occurs also at the coast of Chili and Peru :

V. laevigata G. B. Sowerby : shallow water, down to 150 m.

The species of the South Polar Region is :

V. mitra, n. sp., ± 555 m.

The species from the Pacific, near the Kermadec Islands, is :

V. sulcata Hoek, 950-1165 meters.

The species dredged in the Malay Archipelago, South of the Philippine Islands, is :

V. nitida Hoek, from 915 m.

Kjöbenhavn, January 1907

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